DuPage River Salt Creek Workgroup

Chloride Management and Implementation of Chloride TMDLs in NE Illinois

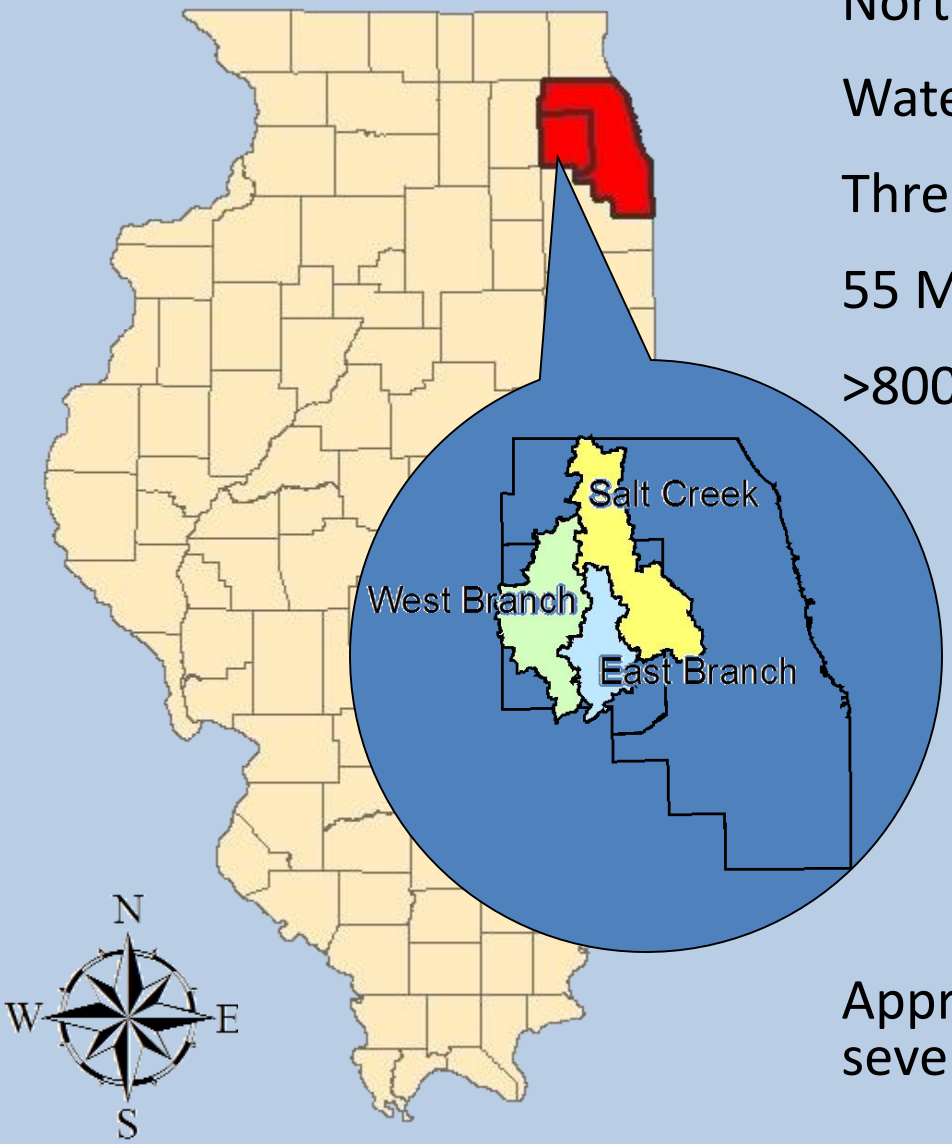
Stephen McCracken
NJWMC Meeting
09. 26. 2018

DuPage River Salt Creek Workgroup

Agency Members (blue)
Associate Members (gray)

Village of Addison · AECOM · Arcadis US · Village of Arlington Heights · Baxter & Woodman · Village of Bartlett · Village of Bensenville · Black & Veatch · Village of Bloomingdale · Village of Bolingbrook · CDM Smith · The Conservation Foundation · Village of Carol Stream · Christopher B. Burke Engineering · Village of Clarendon Hills · Clark-Dietz · Donohue & Associates · Village of Downers Grove · Downers Grove Sanitary District · DuPage County · DuPage County Health Department · City of Elmhurst · Elmhurst-Chicago Stone Company · Engineering Resource Associates · Forest Preserve District of DuPage County · Geosyntec Consultants · Glenbard Wastewater Authority · Village of Glen Ellyn · Village of Glendale Heights · HDR · HR Green · Village of Hanover Park · Hey & Associates · Village of Hinsdale · Village of Hoffman Estates · Huff & Huff · Illinois Department of Transportation · Illinois State Toll Highway Authority · Inter-Fluve · Village of Itasca · K-Tech Specialty Coatings · Mary Lou Kalsted · Village of Lisle · Lisle Township Highway Dept. · Village of Lombard · Monroe Truck Equipment · The Morton Arboretum · City of Naperville · Naperville Park District · Naperville Township Road Dist. · City of Northlake · City of Oakbrook Terrace · Prairie Rivers Network · RHMG Engineers · RJN Group · Robinson Engineering · Village of Roselle · Salt Creek Sanitary District · Salt Creek Watershed Network · Village of Schaumburg · Sierra Club, River Prairie Group · Strand Associates · Suburban Laboratories · Trotter & Associates · V3 Companies · Village of Villa Park Walter E. Deuchler Associates · City of Warrenville · WellSpring Environmental Products · City of West Chicago · Village of Westmont · City of Wheaton · Wheaton Sanitary District · Village of Winfield · City of Wood Dale · Village of Woodridge · York Township Highway Department

DRSCW Program Area



Northeastern IL: DuPage & Cook Counties

Watershed is approximately 360 sq mi

Three waterways (100 mainstem miles)

55 Municipalities

>8000 Road miles

25 POTWs
156 MGD of effluent (DAF)

Urban - suburban
48.7% Residential
24.7% Non-residential urban
26.6% Open space, including water

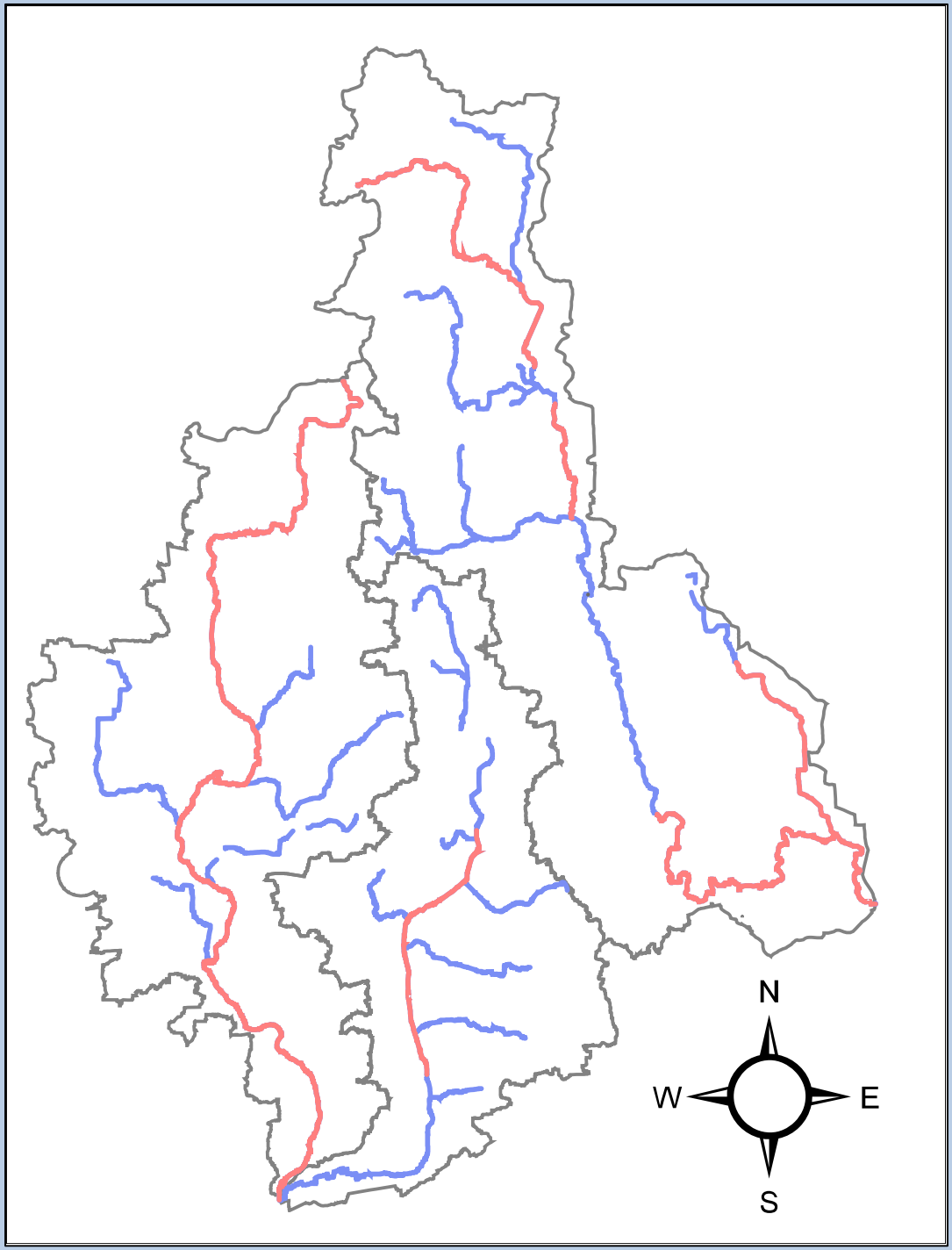
Approved TMDLs for DO and chloride on several reaches


Office DEPOT
ASTON MARTIN
L.A. TAN
MATTRESS FIRM
THE JOINT
Perillo
SportClips HAIRCUTS
FIVE GUYS
OGDEN AVE (35,800 VPD)
FAIRVIEW AVE (14,800 VPD)
PNC
CVS pharmacy
Subject Property

Chloride Water Quality Standards

Parameter National Criteria (Federal)	Chronic (mg/l)	Acute (mg/l)
Chloride (total)*	230	860
Iowa State Standard	**Chronic (mg/l)**	**Acute (mg/l)**
Chloride (total)*	389	629
Wisconsin State Standard	**Chronic (mg/l)**	**Acute (mg/l)**
Chloride (total)*	395	757
Illinois State Standard	**(mg/l)**	
Chloride (total)	500	
Indiana State Standard	**(mg/l)**	
Chloride (total)*	C = 287.8 (hardness) 0.205797 (sulfate)-0.07452	

*Based on given concentrations of sulphate and hardness
Federal value under review

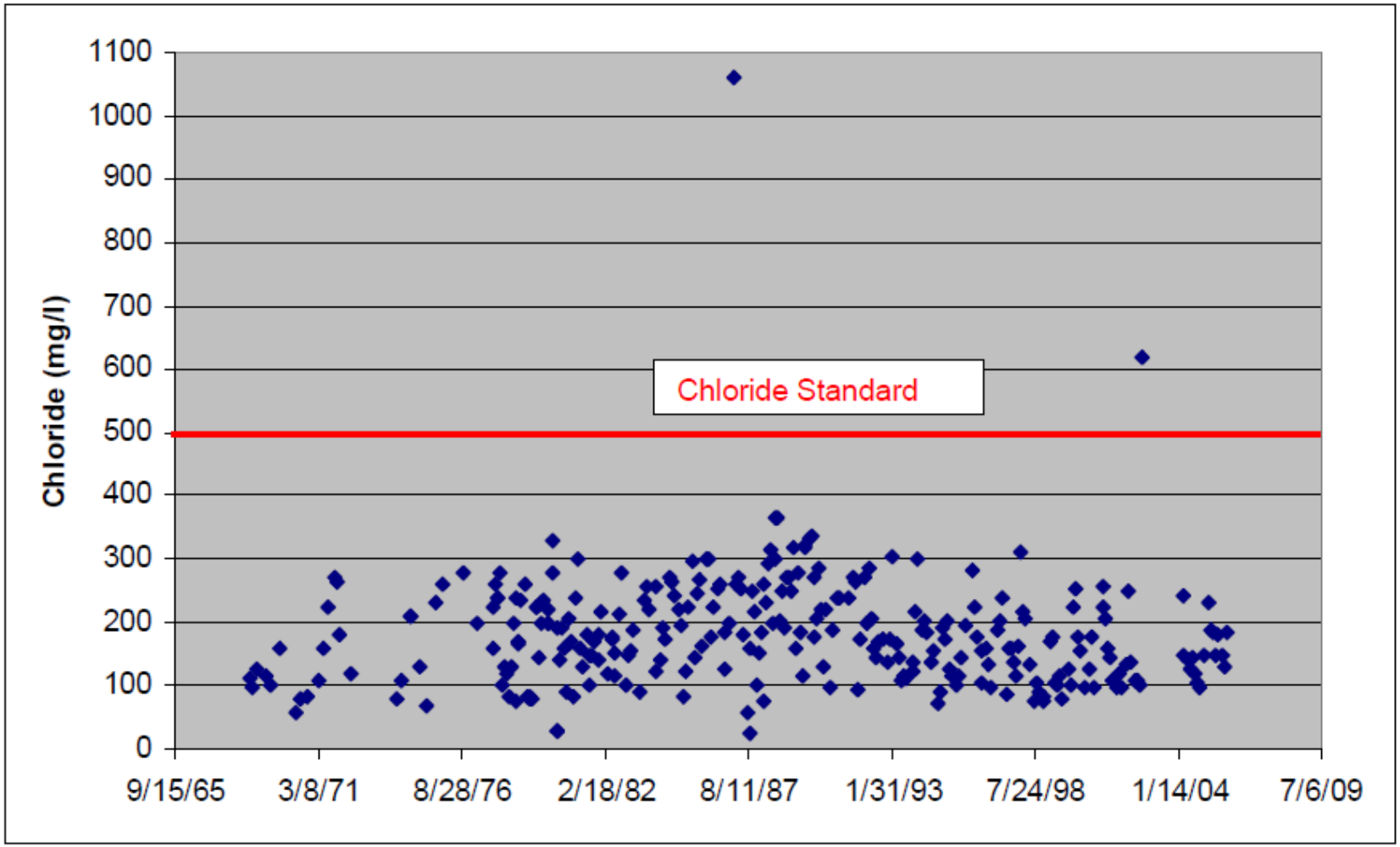


TMDL Reaches in the DRSCW Program Area

In 2004 TMDLs were approved for 10 segments:

- Chloride (7 reaches)
- TDS (9 reaches)
- Conductivity (5 reaches)

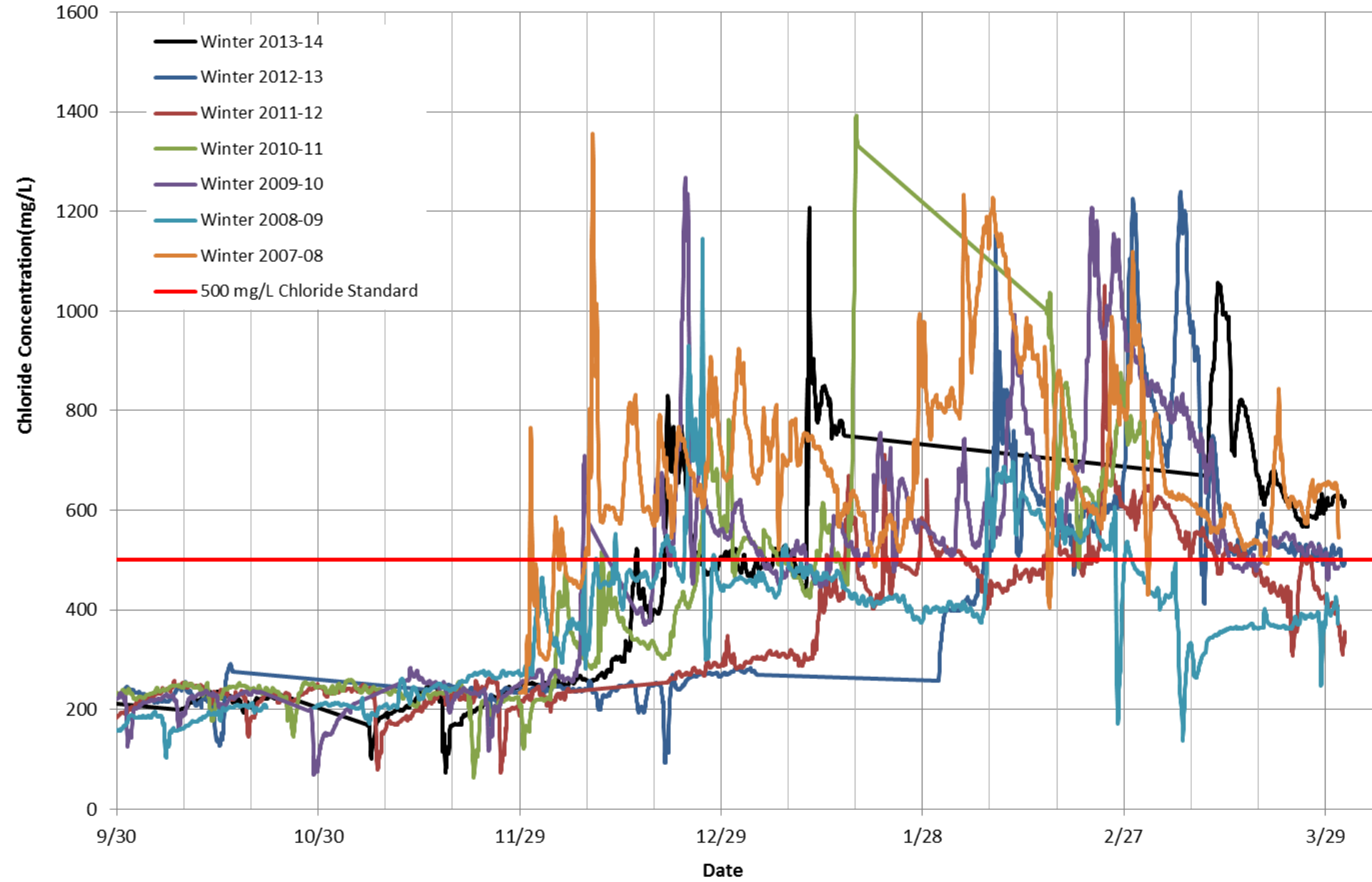
State Water Quality Data For Developing TMDLs

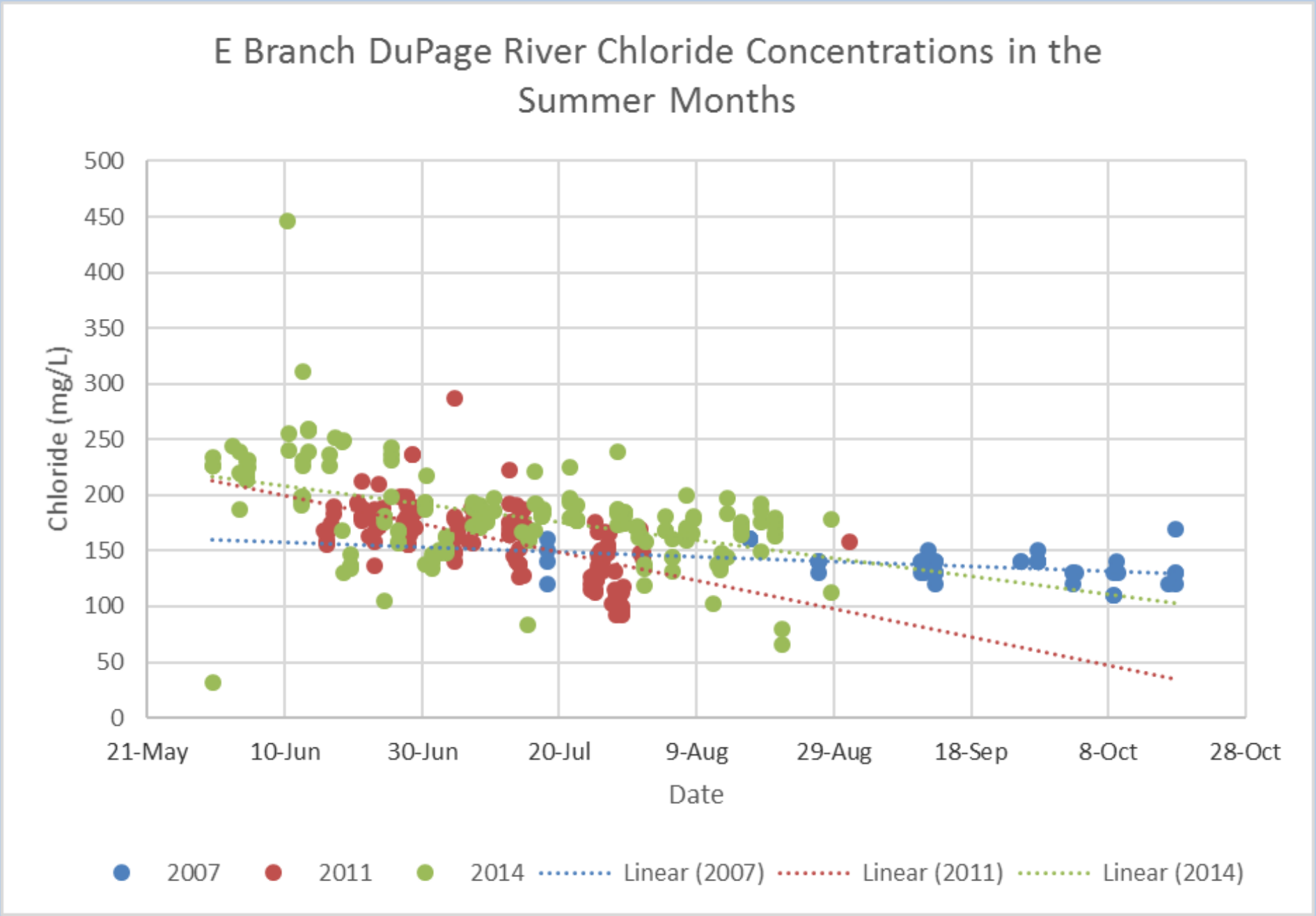


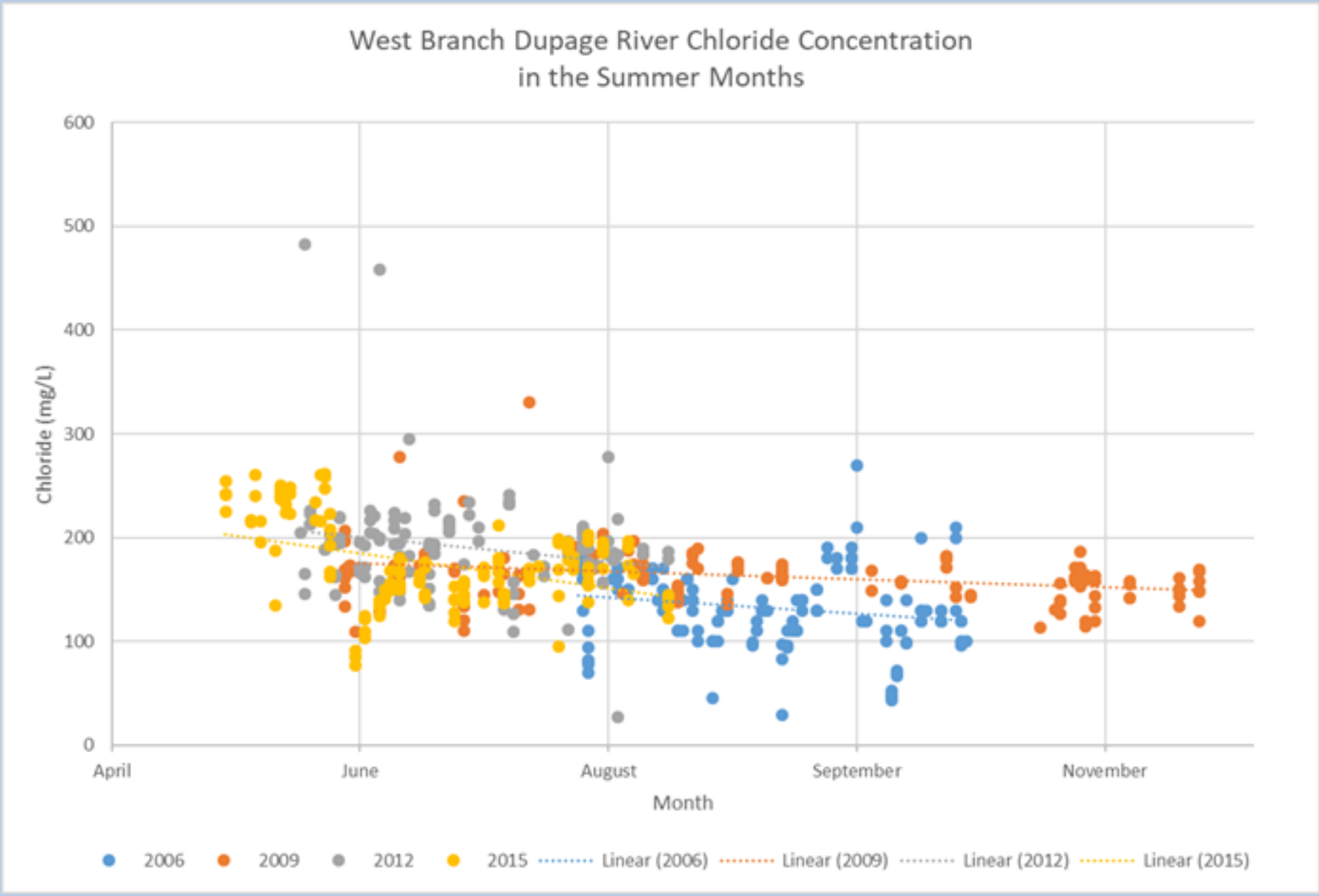
Where Are They Coming From ?

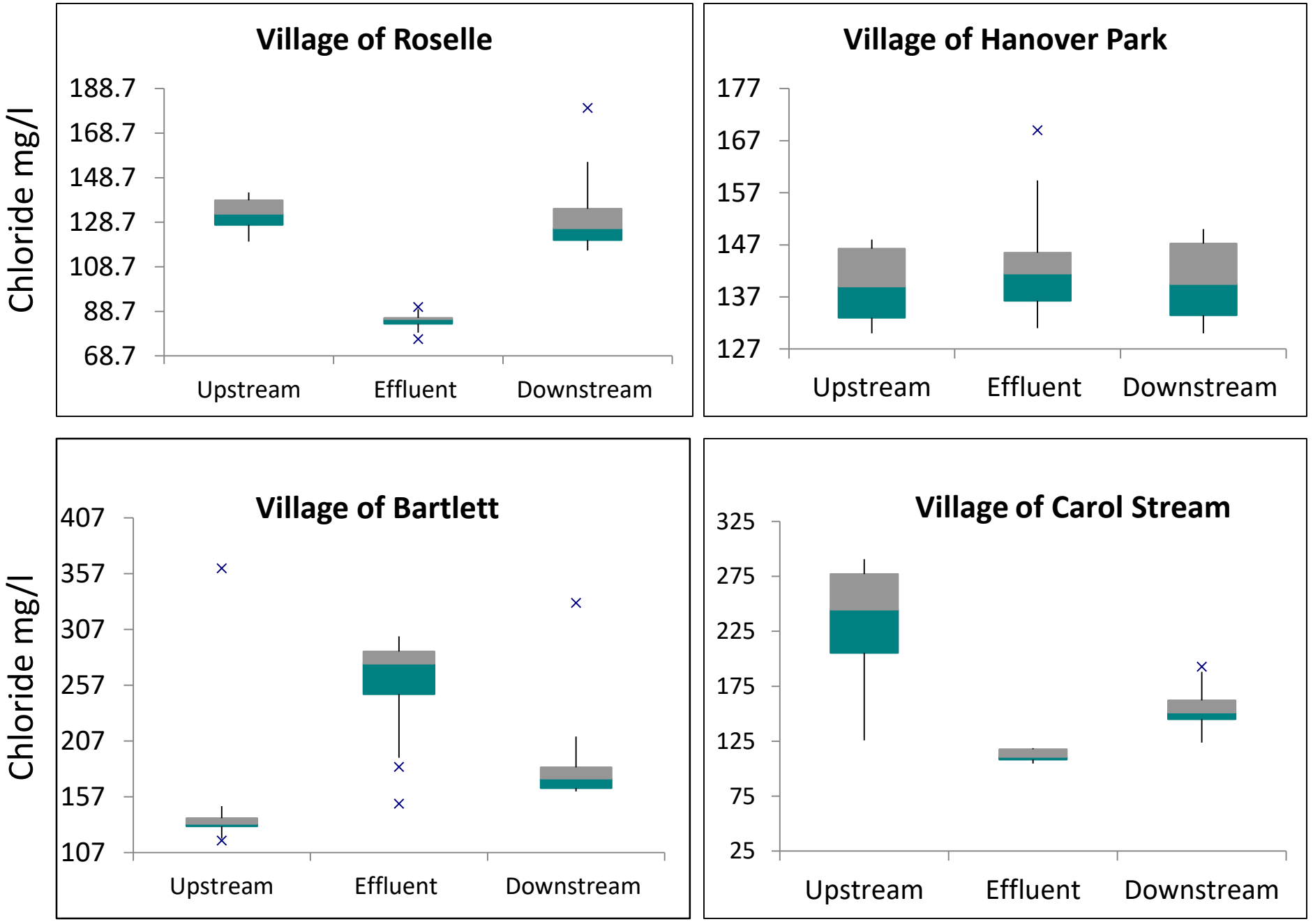
Conductivity Monitoring

SCWR Estimated Chloride Concentration
Winter 2007-2013 Comparison




E Branch DuPage River Chloride Concentrations in the Summer Months
Chloride (mg/L)
500
450
400
350
300
250
200
150
100
50
0
21-May
10-Jun
30-Jun
20-Jul
9-Aug
29-Aug
18-Sep
8-Oct
28-Oct
Date
2007
2011
2014
Linear (2007)
Linear (2011)
Linear (2014)


West Branch Dupage River Chloride Concentration
in the Summer Months
Chloride (mg/L)
600
500
400
300
200
100
0
April
June
August
September
November
Month
2006
2009
2012
2015
Linear (2006)
Linear (2009)
Linear (2012)
Linear (2015)



Chloride Concentrations in Select POTW effluent (2012)

Program Goals

- Illinois EPA TMDL recommended chloride load reductions
  - Salt Creek - 14% reduction
  - East Branch DuPage River - 33% reduction
  - West Branch DuPage River - 35% reduction

- DRSCW / local agency data comparison:

	Salt Creek	East Branch	West Branch	Total
TMDL Target, Tons of Cl^-/yr	13,300	5,200	13,700	32,200
TMDL Baseline, Tons of Cl^-/yr	15,500	7,800	21,100	44,400
DRSCW Baseline, Tons of Cl^-/yr	32,600	16,900	21,200	70,700

What Can Be Done About It ?

Guidance from 2004 TMDL

- Optimization of use:

Storage:

- Salt storage piles need to be completely covered (i.e., use of salt domes)
- Storage and handling operations should be performed on impervious surfaces
- Stormwater runoff from areas where salt is stored should be contained in a suitable area

- *Application:*

- Use of calibrated spreaders; trucks can be equipped with ground speed sensors that can accurately control the rate of spreading
- Training programs for drivers and handlers should be implemented to improve the efficiency of application and to reduce losses
- Snow plow operators need to avoid piling snow on or near frozen ponds, lakes, streams, or wetlands

- Other:

- Identify ecosystems that are sensitive to salts
- Use of alternatives such as calcium chloride and calcium magnesium acetate may be less environmentally harmful to sensitive ecosystems; these alternatives are more expensive than regular salt, but they are less corrosive to bridges and overpasses (see Tables 7-1 and 7-2 for information on these alternatives)
- In some instances, sand may be used in place of salt to improve traction, but that may not be appropriate where sedimentation presents adverse environmental impacts

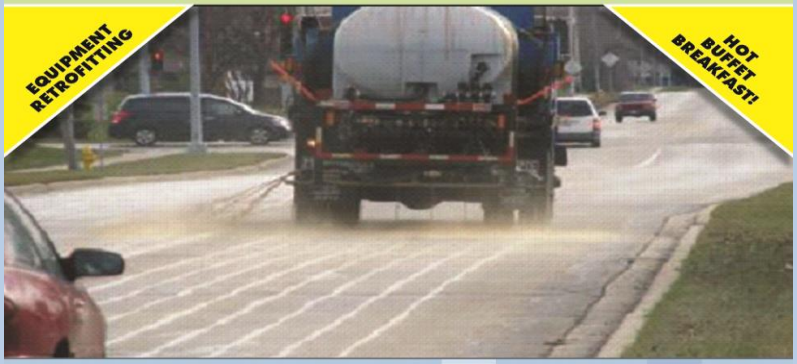
Steps for Salt Use Reduction

- Driver training
- Salt storage
- Salt spreader calibration
- Develop appropriate application rates/LOS*
- Pre-wet de-icer
- Equipment updates
  - Speed servo controls
  - On-board pre-wet
  - Computer controls
- Coordinate salt application during plowing
- Control salt spread width
- Prioritize road system
- Anti-Ice

LOS – Level of service

Adapted from material developed by Steve Karr

SAVE THE DATE



Less Salt, Less Money, Enough Said.

2011 Public Agency Deicing Workshop

When:
Wednesday, October 12, 2011

Time:
7:30 am – Noon

Location:
Arrowhead Golf Club – Wheaton, IL

Cost:
$45.00 ($35.00 for APWA and DRSCW members)

Who Should Attend

- Municipal Public Works Managers and Staff
- City Managers and Program Administrators

Preliminary Agenda

- Liquids Retrofitting – Equipment and Facilities
  - Mark DeVries, McHenry County
  - Harvey Williams, APWA Winter Maintenance Subcommittee
  - The Village of Hanover Park
    - Howard Killian, Director of Public Works
    - Scott Weber, Street and Forestry Division Supervisor
- Current Regulatory and Program Management Concerns
- Retrofitted Equipment Show

Registration is required and information will be distributed soon.
Training certificates will be provided, 4 PDH's available.

Hosted By:

APWA · DuPage River Salt Creek Workgroup · The County of DuPage, Illinois · CDM

Contact **Stephen McCracken** at **1-630-428-4500** or smccracken@theconservationfoundation.org with any questions.
Visit http://drscw.org/winter.html for registartion forms and more information.

Funding for this seminar is provided in part by the Illinois Environmental Protection Agency through Section 319 of the Clean Water Act.

SAVE THE DATE

Less Salt, Less Money, Enough Said.

2011 Parking Lot & Sidewalk Deicing Workshop

When:
Thursday, October 13, 2011

Time:
7:30 am – 12:30 pm

Location:
Arrowhead Golf Club – Wheaton, IL

Cost:
$25.00

Who Should Attend

- Facility Managers, Superintendents, and Staff
- Commercial Deicing Contractors, Business Managers, and Staff
- Municipal Code Enforcement Staff

Preliminary Agenda

- Overview of Current Regulatory and Facility Management Concerns
- Expert Training by FORTIN CONSULTING, INC. serving the environment – Hamel, MN

Registration is required and information will be distributed soon.
Training certificates will be provided, 4 PDH's available.

Hosted By:

DuPage River Salt Creek Workgroup · The County of DuPage, Illinois · CDM

Contact **Stephen McCracken** at **1-630-428-4500** or smccracken@theconservationfoundation.org with any questions.
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STAY BACK
H-98
OBAMA'08

How Clean is Clean Enough?

Used with Permission of Dr. Wilfrid Nixon of the Salt Institute

Calibration Chart

Agency: _____

Location: _____

Truck No.: _____ Spreader No.: _____

Date: _____ By: _____

Gate Opening (Hopper Type Spreaders)				Pounds Discharged Per Mile								
	A	B	C	Minutes to Travel One Mile								
Control Setting	Shaft RPM (Loaded)	Discharge Per Revolution (Pounds)	Discharge Rate (lb/min)	5 mph x 12.00	10 mph x 6.00	15 mph x 4.00	20 mph x 3.00	25 mph x 2.40	30 mph x 2.00	35 mph x 1.71	40 mph x 1.50	45 mph x 1.33
1		This weight remains constant										
2												
3												
4												
5												
6												
7												
8												
9												
10												

MDOT Study "Salt Bounce and Scatter Study" November 2012

The study concluded that speed was the most significant variable affecting the percentage of salt that remained in the target area. The percentage of dry salt ending up in the wasted zone went from 0% to 13% when speed increased from 25 to 35 mph and increased to 26% at 45 mph. The amount of salt in the travel lane at 25 mph was double that found in the 35 mph tests.

The second most important variable was the use of treated salt. Salt in the study was treated by adding a liquid deicer to a stockpile of untreated salt at a rate of 8 gallons per ton.

At 25 mph, 0% of the treated salt ended up in the gutter compared to 5% of the untreated salt. Again the amount retained in the travelling lane was increased, here by 10%.

Vehicles using a conveyor at 35 mph to apply dry salt would result in 25% of the applied salt ending up in the gutter, whereas the same vehicle operating at 25 mph with treated salt would place none in the gutter.

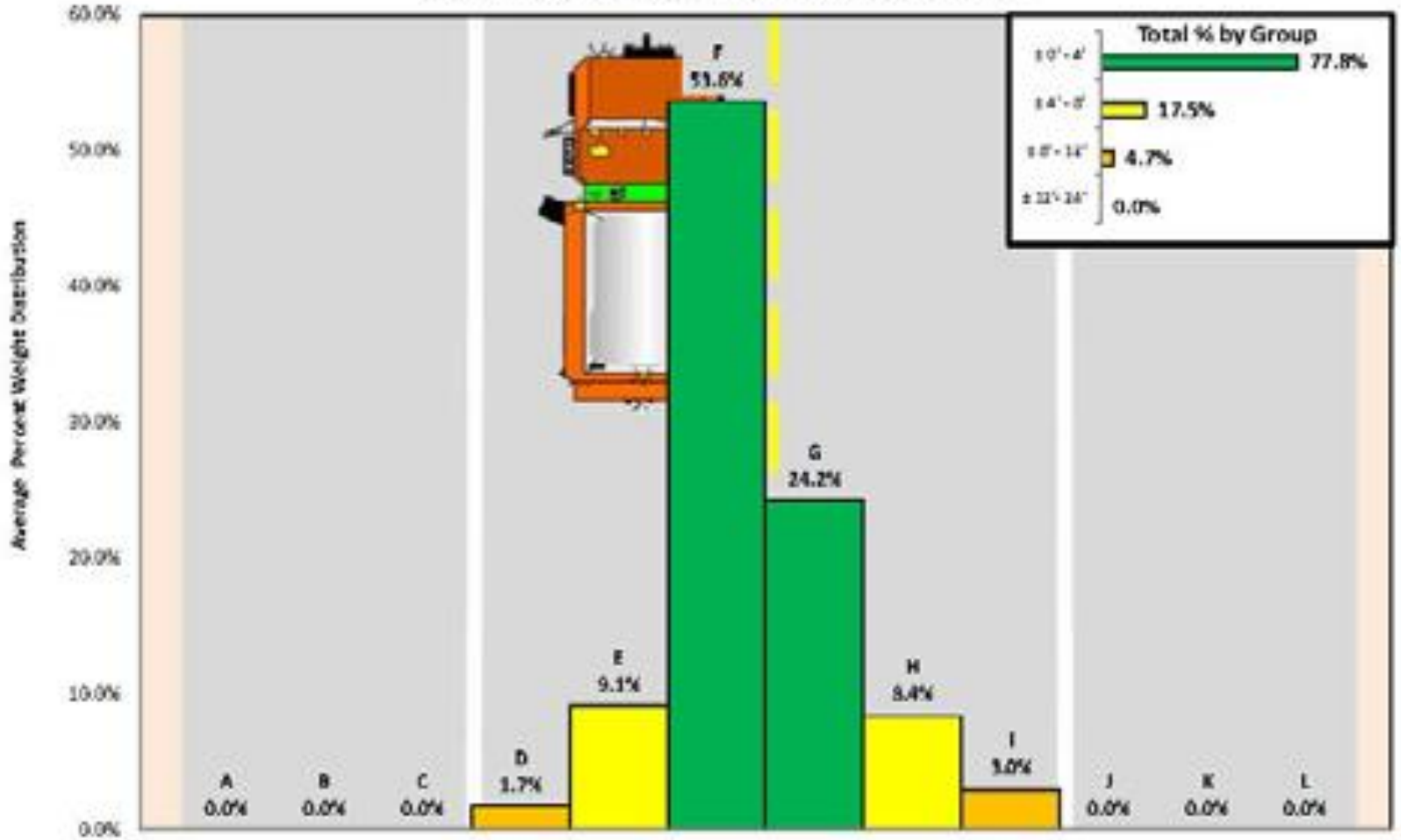
Note: Each letter represents a 4' width by 100' length portion of the collection grid

MDOT Michigan Department of Transportation

Operations Field Services Division

Southwest Region June 2012

Bounce and Scatter Collection Graphs



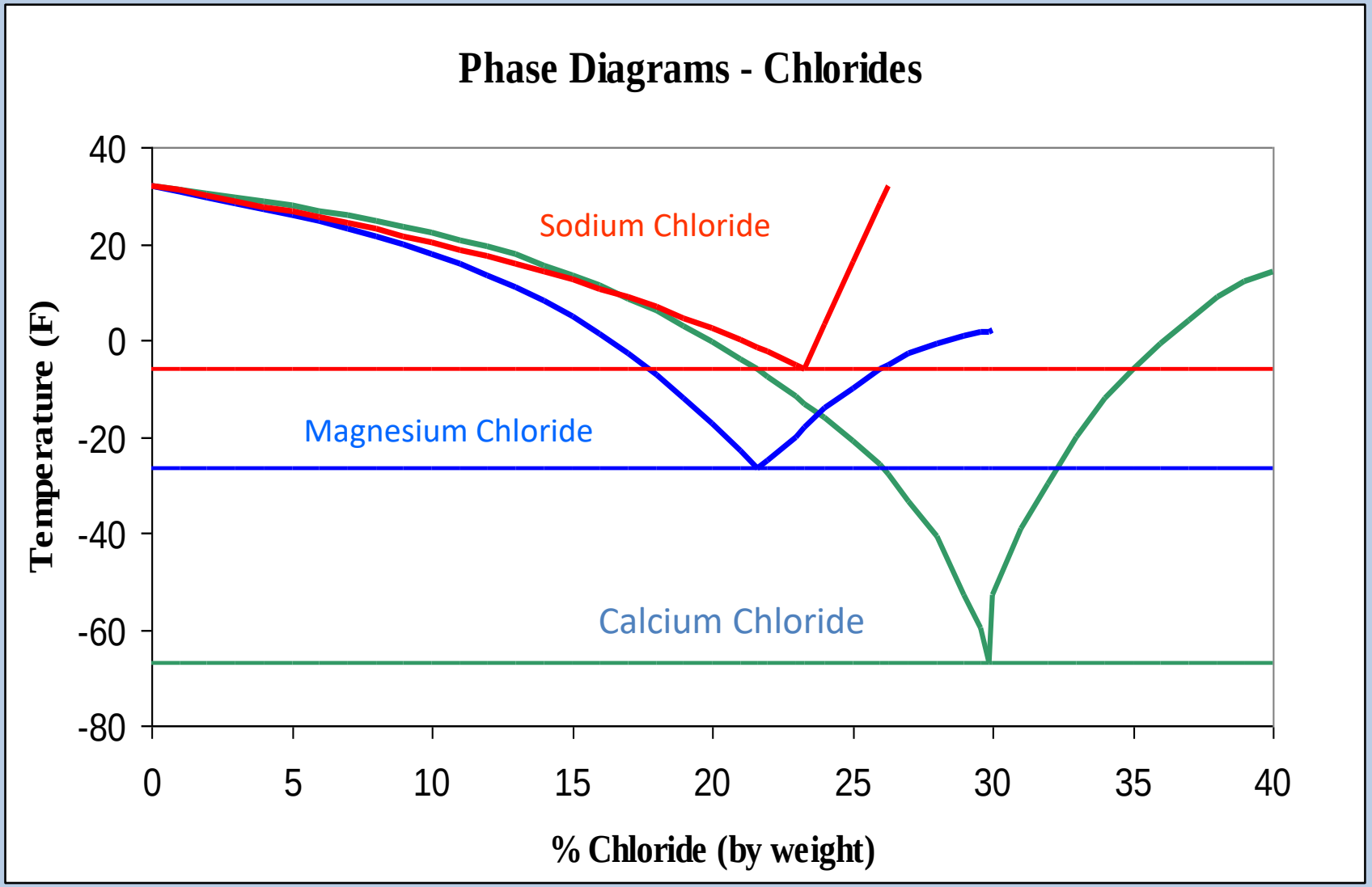
Note: Each letter represents a 4' width by 100' length portion of the collection grid.

MDOT Michigan Department of Transportation

Operations Field Services Division

Southwest Region
June 2012

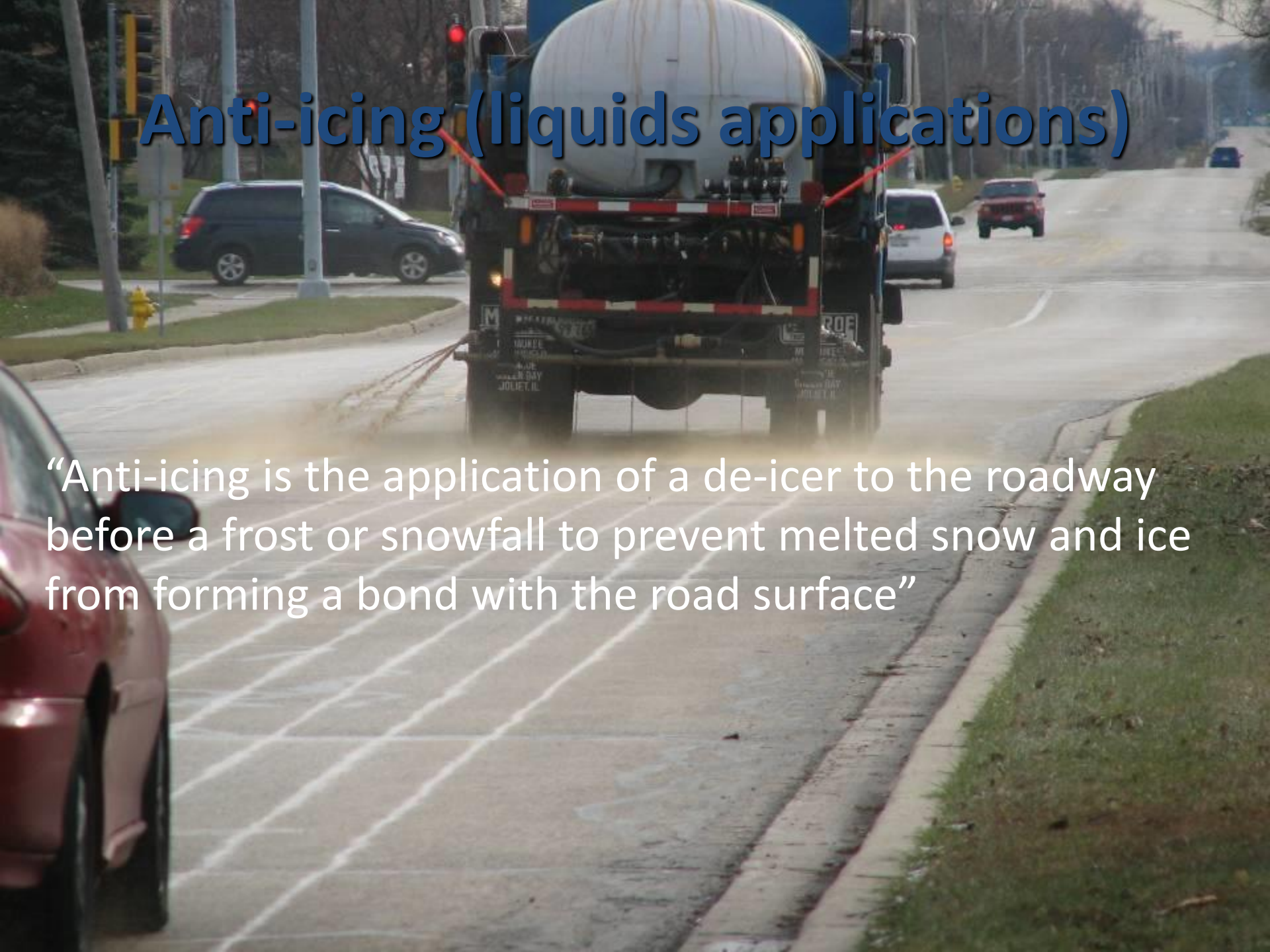
Ice Control Chemicals



Getting Started : Treating Salt

Evolution

Anti-icing (liquids applications)



"Anti-icing is the application of a de-icer to the roadway before a frost or snowfall to prevent melted snow and ice from forming a bond with the road surface"

2017 Parking Lot & Sidewalk Deicing Workshop

Less Salt, Less Money, Enough Said.

Preliminary Agenda

- Overview of Current Regulatory and Facility Management Concerns
- Expert Training by FORTIN CONSULTING, INC. serving the environment – Hamel, MN

Registration is required and information will be distributed soon.
Training certificates will be provided, 4 PDH's available.

When:
Thursday, October 5, 2017

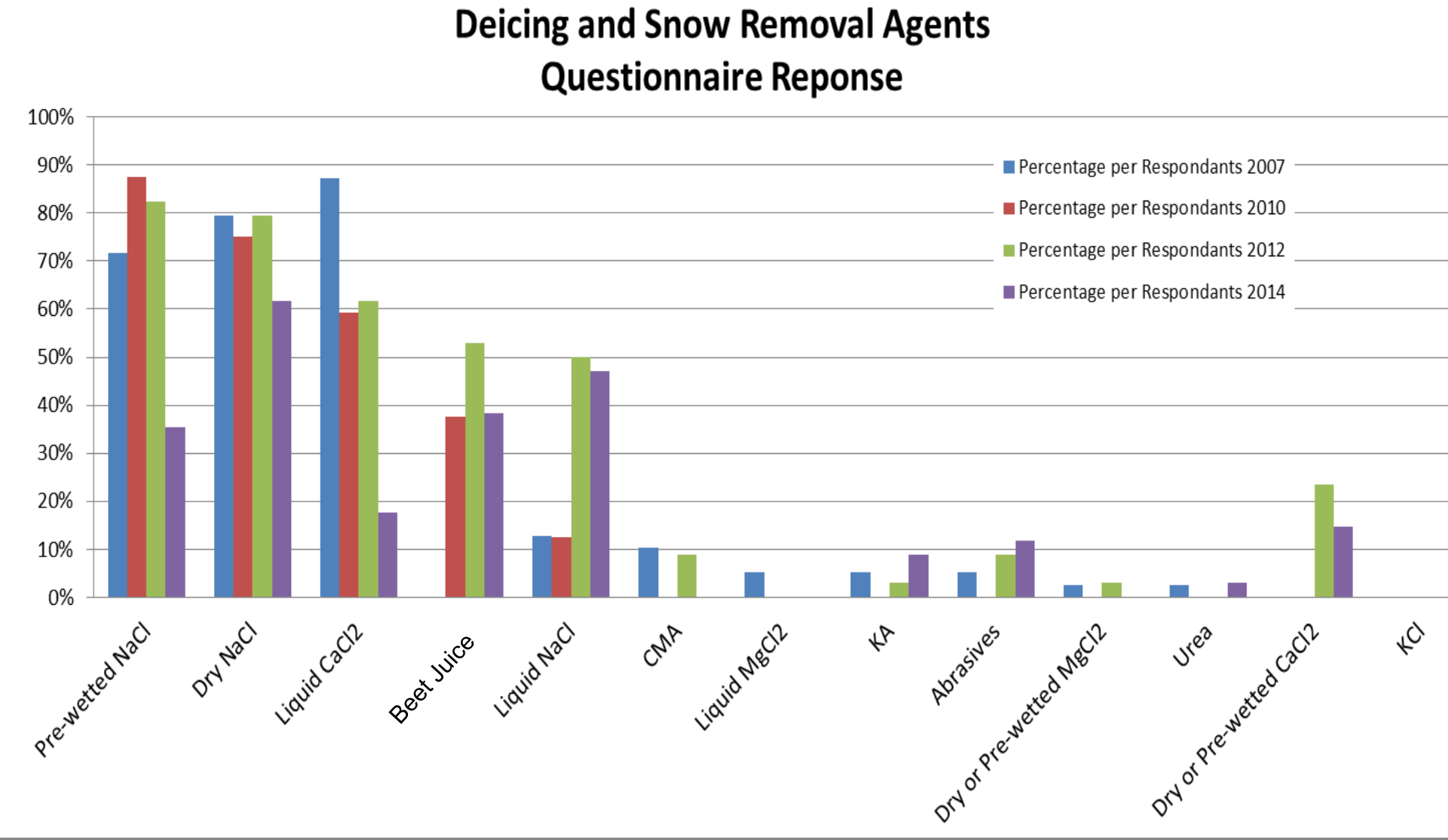
Time:
7:30 am – 12:30 pm

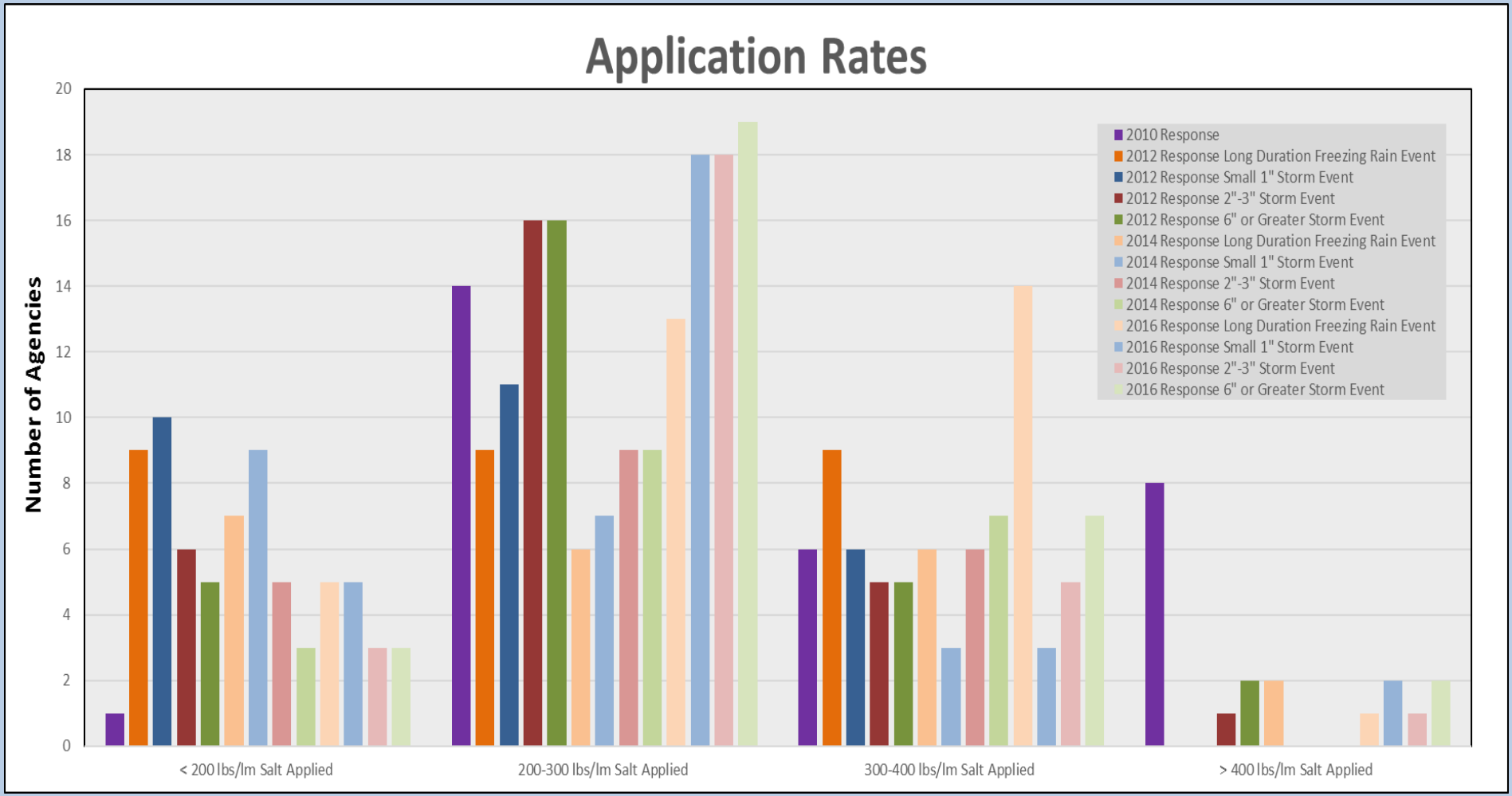
Location:
DuPage County Department of Transportation - Wheaton, IL

Sponsorship Opportunities Available

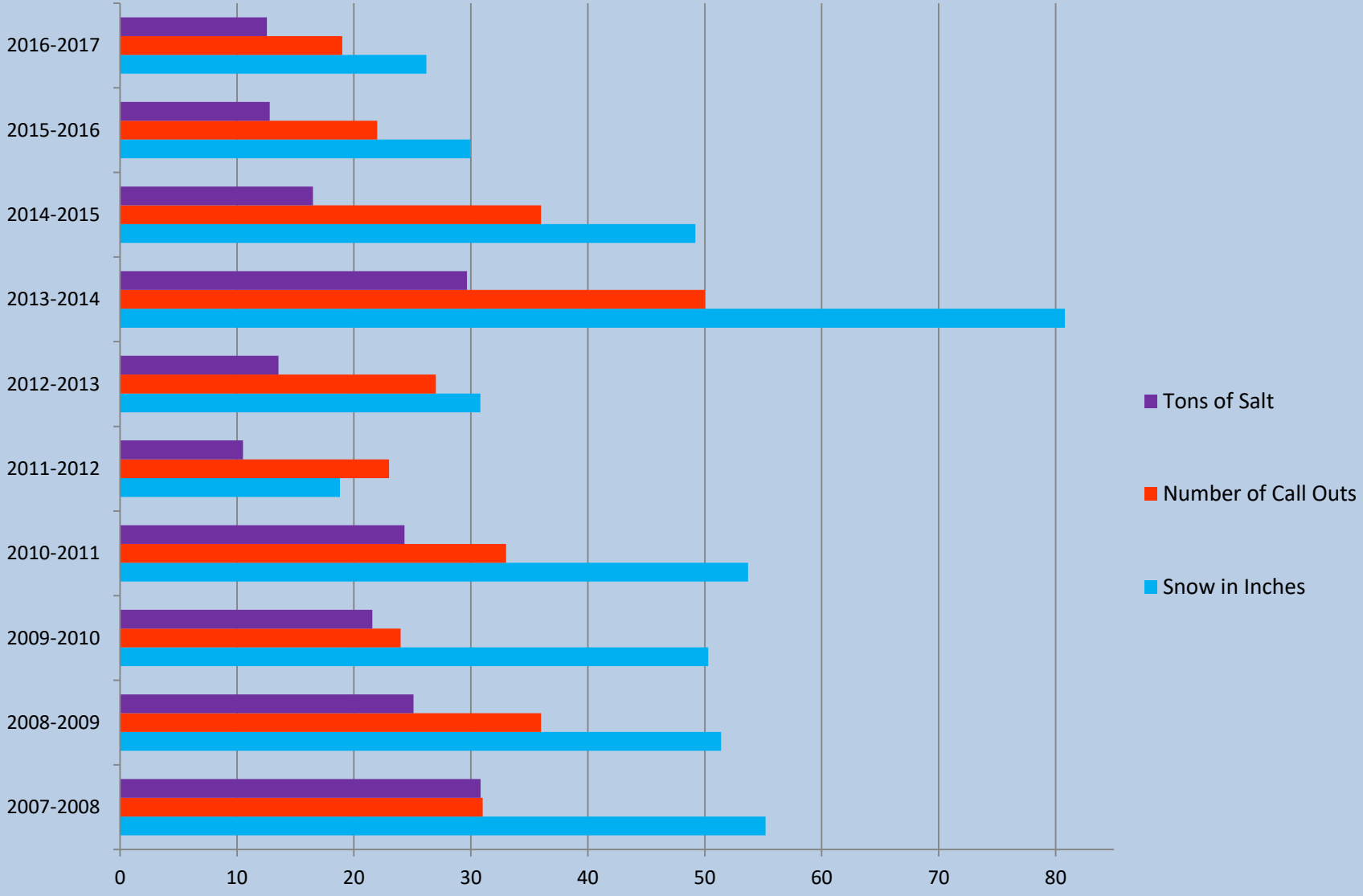
Is it working ?

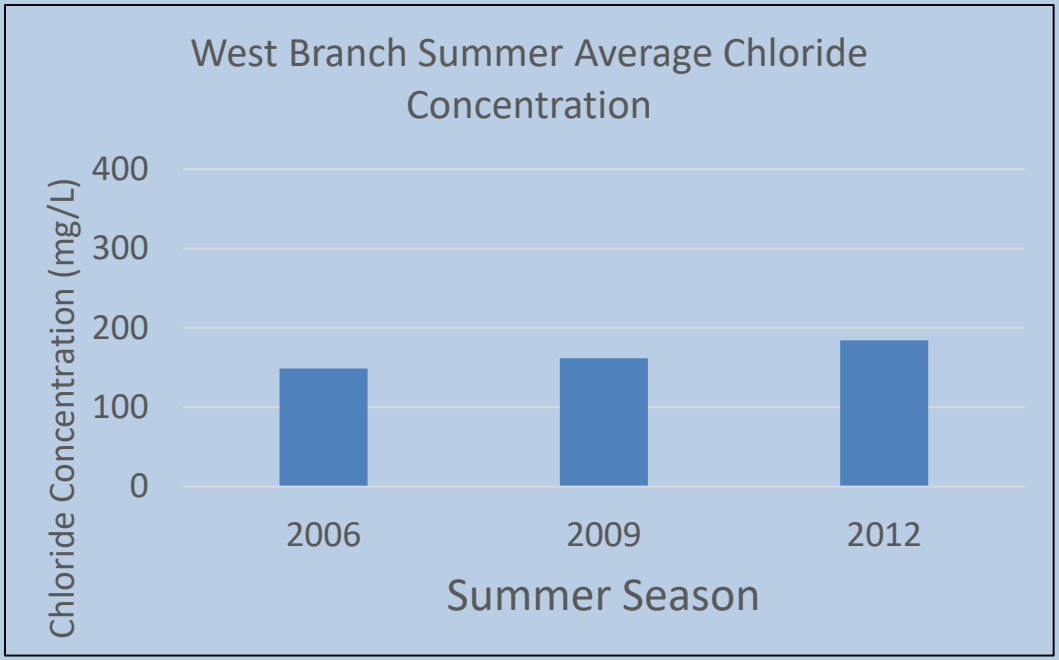
Survey Results 2007-2014



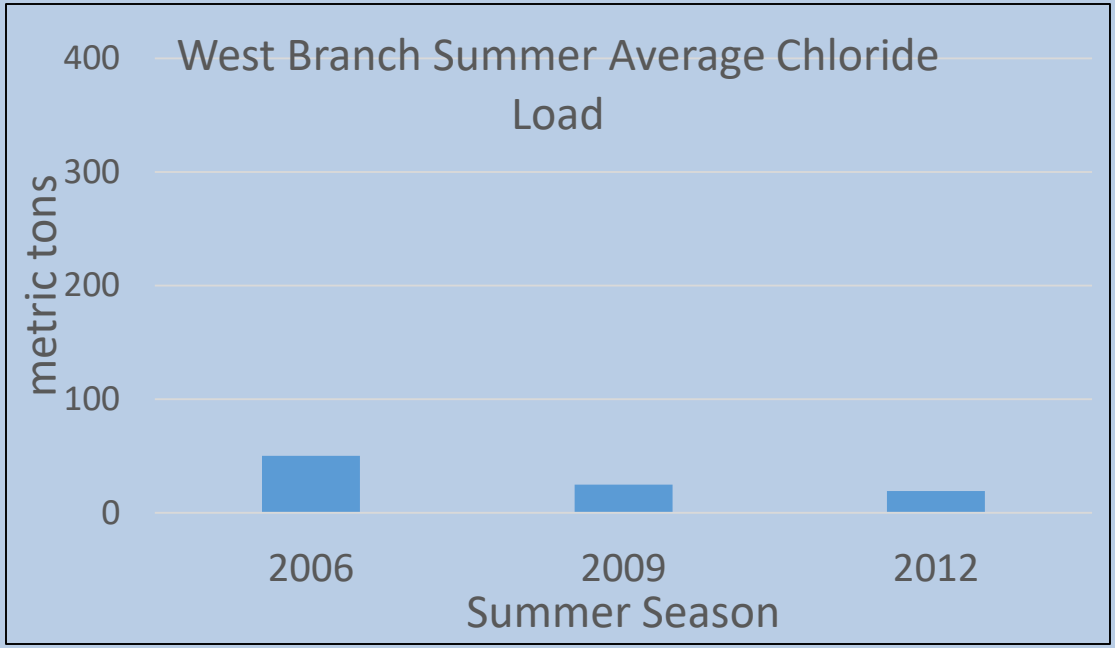

Application Rates
Number of Agencies
0
2
4
6
8
10
12
14
16
18
20
< 200 lbs/lm Salt Applied
200-300 lbs/lm Salt Applied
300-400 lbs/lm Salt Applied
> 400 lbs/lm Salt Applied
2010 Response
2012 Response Long Duration Freezing Rain Event
2012 Response Small 1" Storm Event
2012 Response 2"-3" Storm Event
2012 Response 6" or Greater Storm Event
2014 Response Long Duration Freezing Rain Event
2014 Response Small 1" Storm Event
2014 Response 2"-3" Storm Event
2014 Response 6" or Greater Storm Event
2016 Response Long Duration Freezing Rain Event
2016 Response Small 1" Storm Event
2016 Response 2"-3" Storm Event
2016 Response 6" or Greater Storm Event

DuPage County Division of Transportation 2007-2017





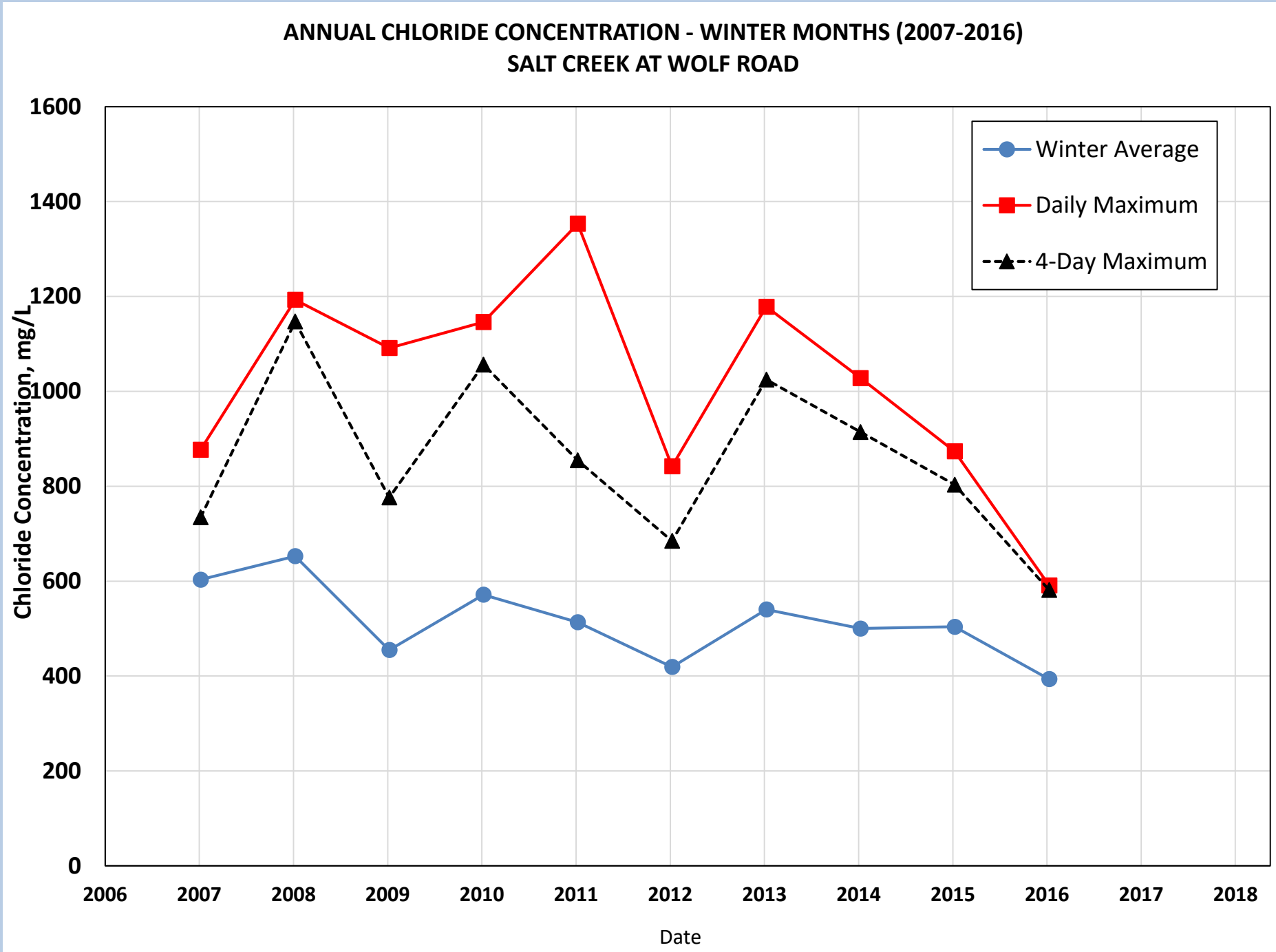
Tracking Impacts on waterways is complex!

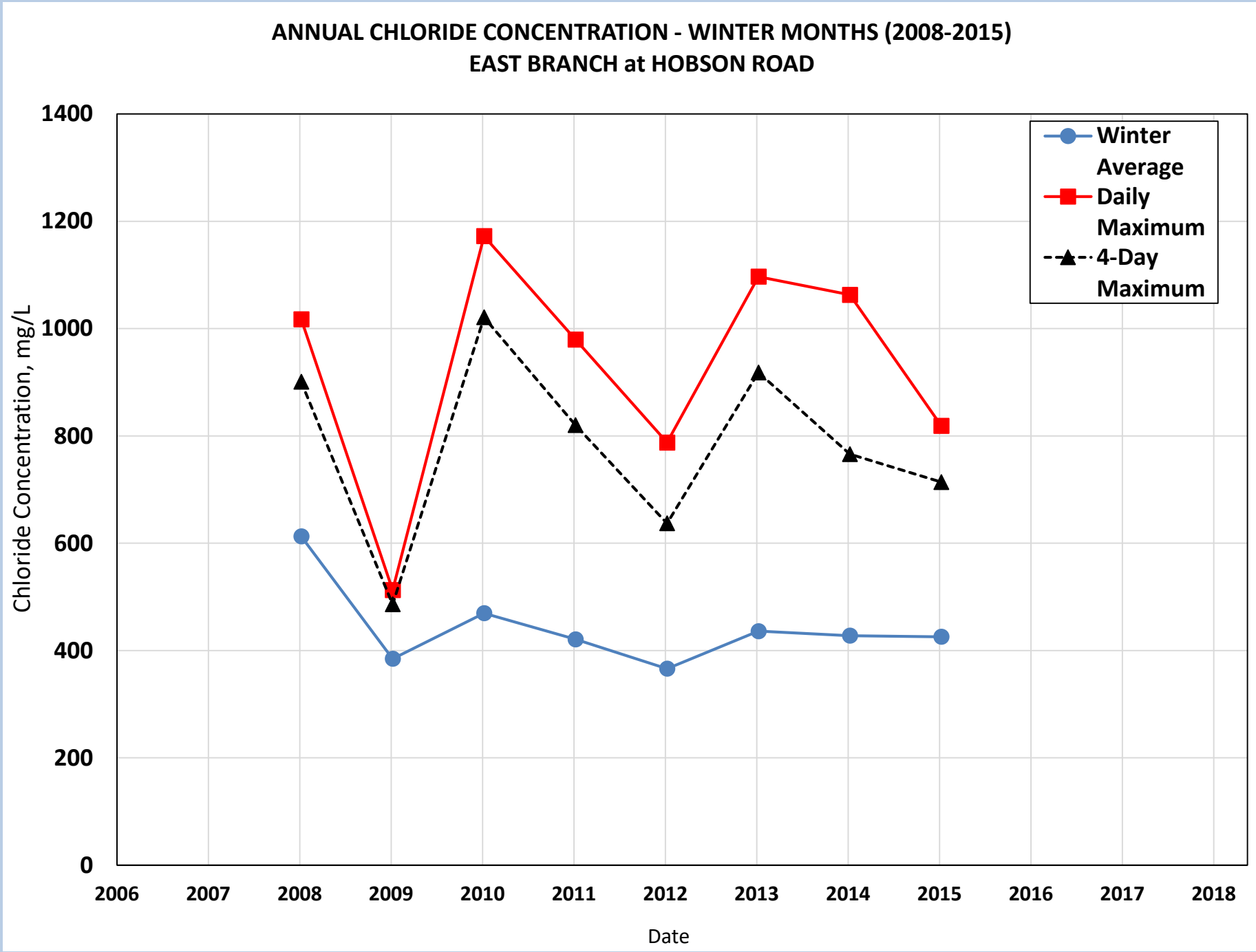


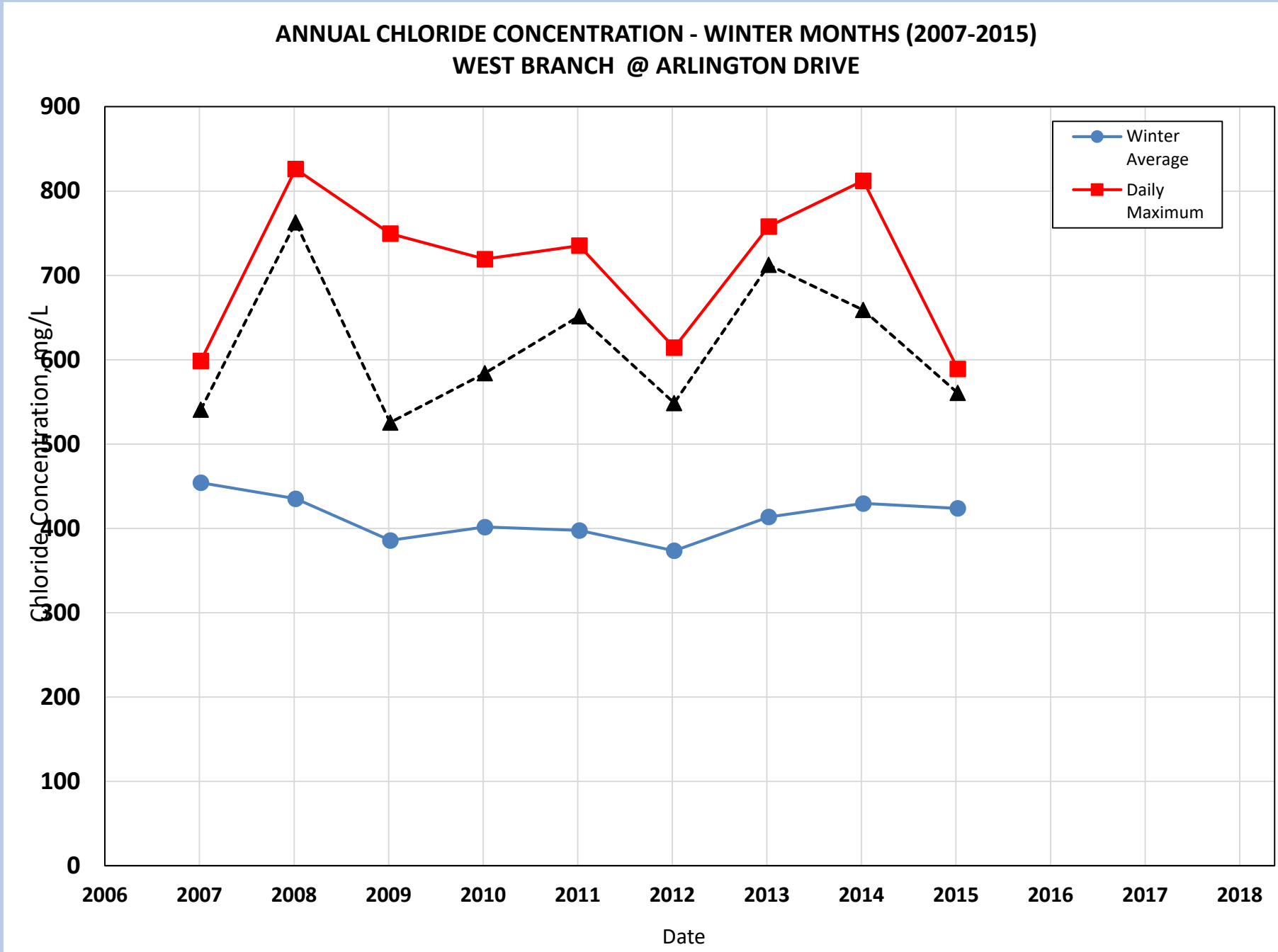
Flow is not the only complicating factor

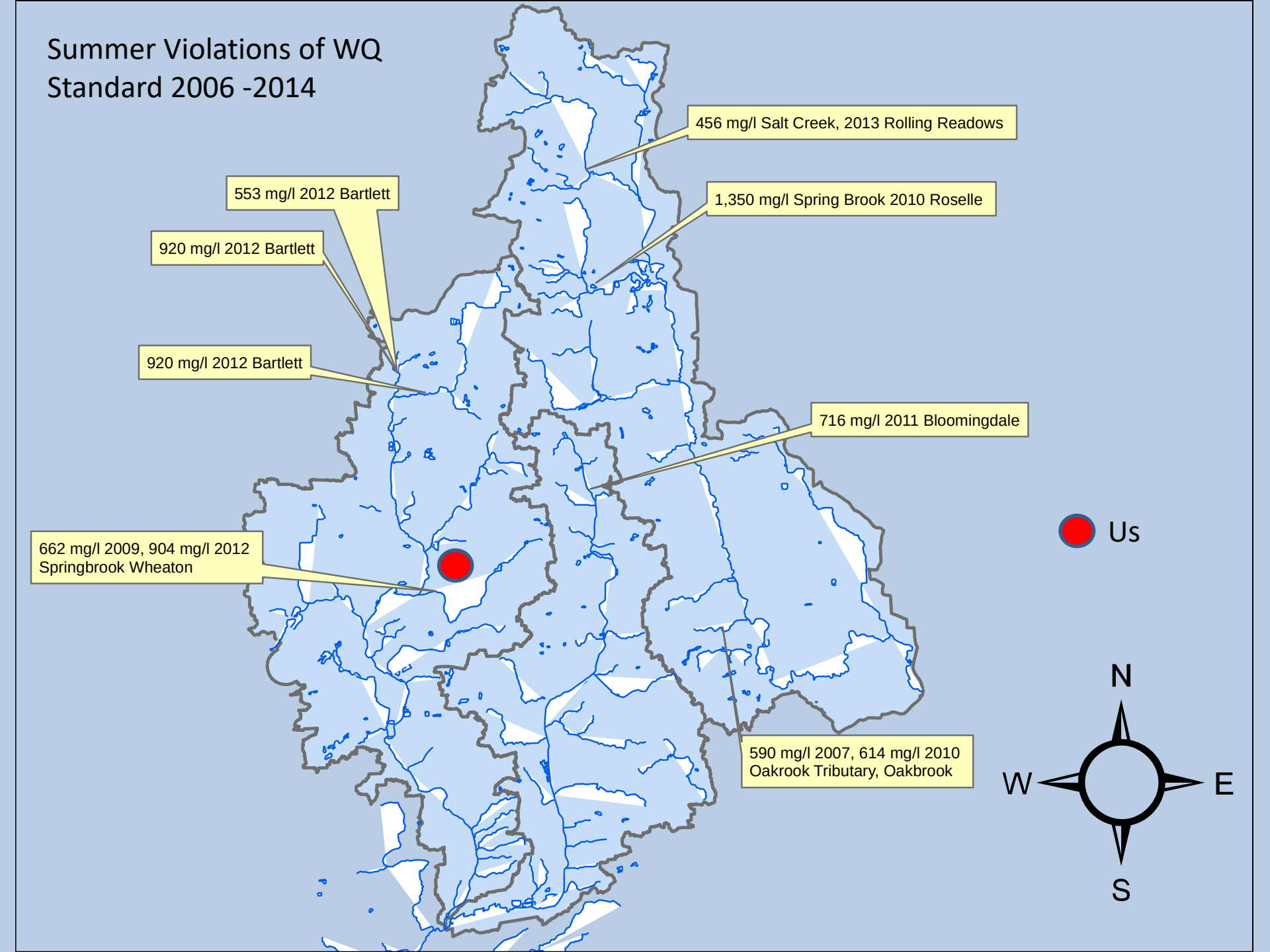
- Number of call outs
- Scale of call outs
- Duration and type of storm
- Pavement temperatures
- Duration of winter months

……All impact the amount of salt used


ANNUAL CHLORIDE CONCENTRATION - WINTER MONTHS (2007-2016)
SALT CREEK AT WOLF ROAD
Chloride Concentration, mg/L
1600
1400
1200
1000
800
600
400
200
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Date
Winter Average
Daily Maximum
4-Day Maximum

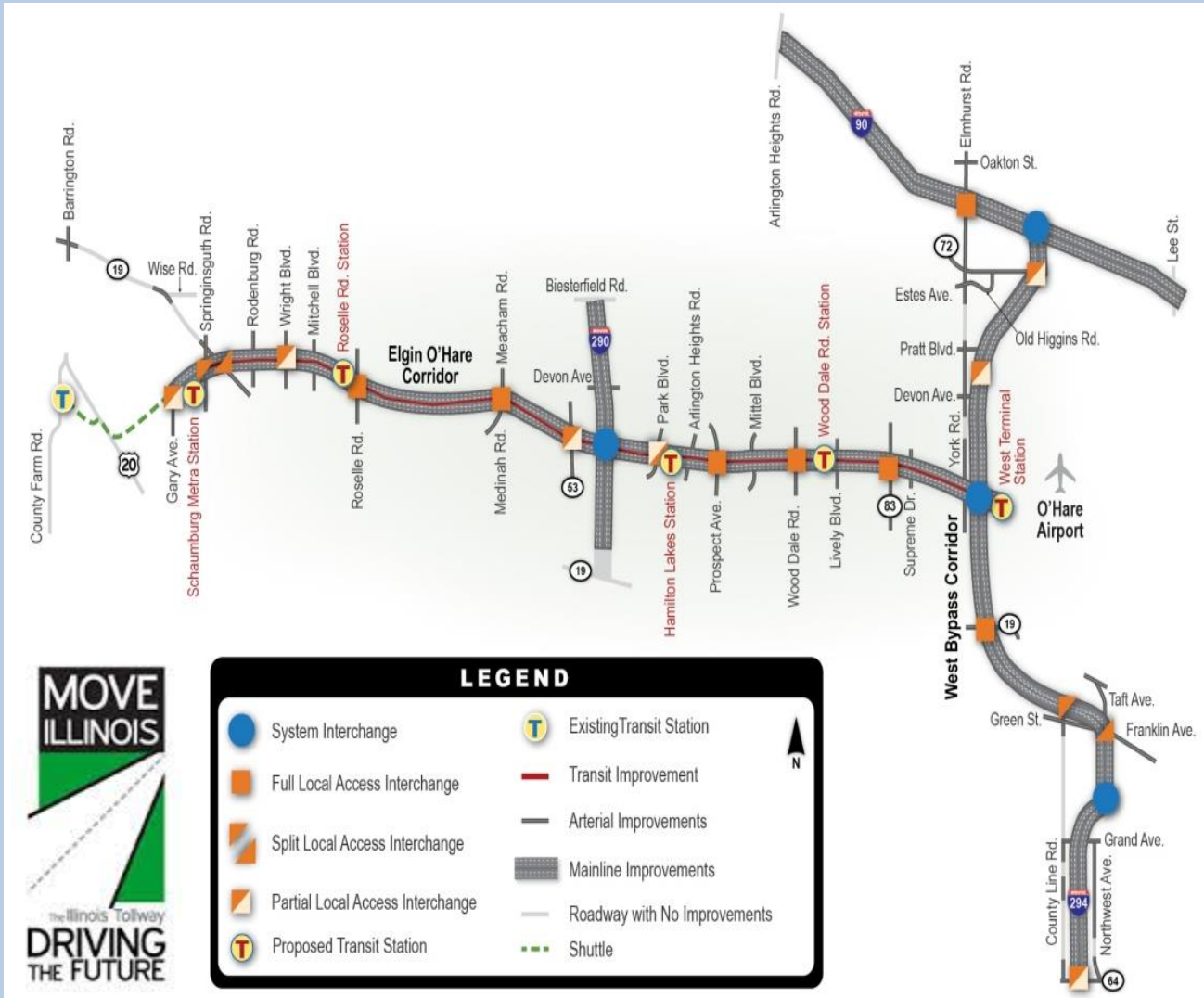

ANNUAL CHLORIDE CONCENTRATION - WINTER MONTHS (2008-2015)
EAST BRANCH at HOBSON ROAD
Chloride Concentration, mg/L
1400
1200
1000
800
600
400
200
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Date
Winter Average
Daily Maximum
4-Day Maximum


ANNUAL CHLORIDE CONCENTRATION - WINTER MONTHS (2007-2015)
WEST BRANCH @ ARLINGTON DRIVE
Chloride Concentration, mg/L
900
800
700
600
500
400
300
200
100
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Date
Winter Average
Daily Maximum

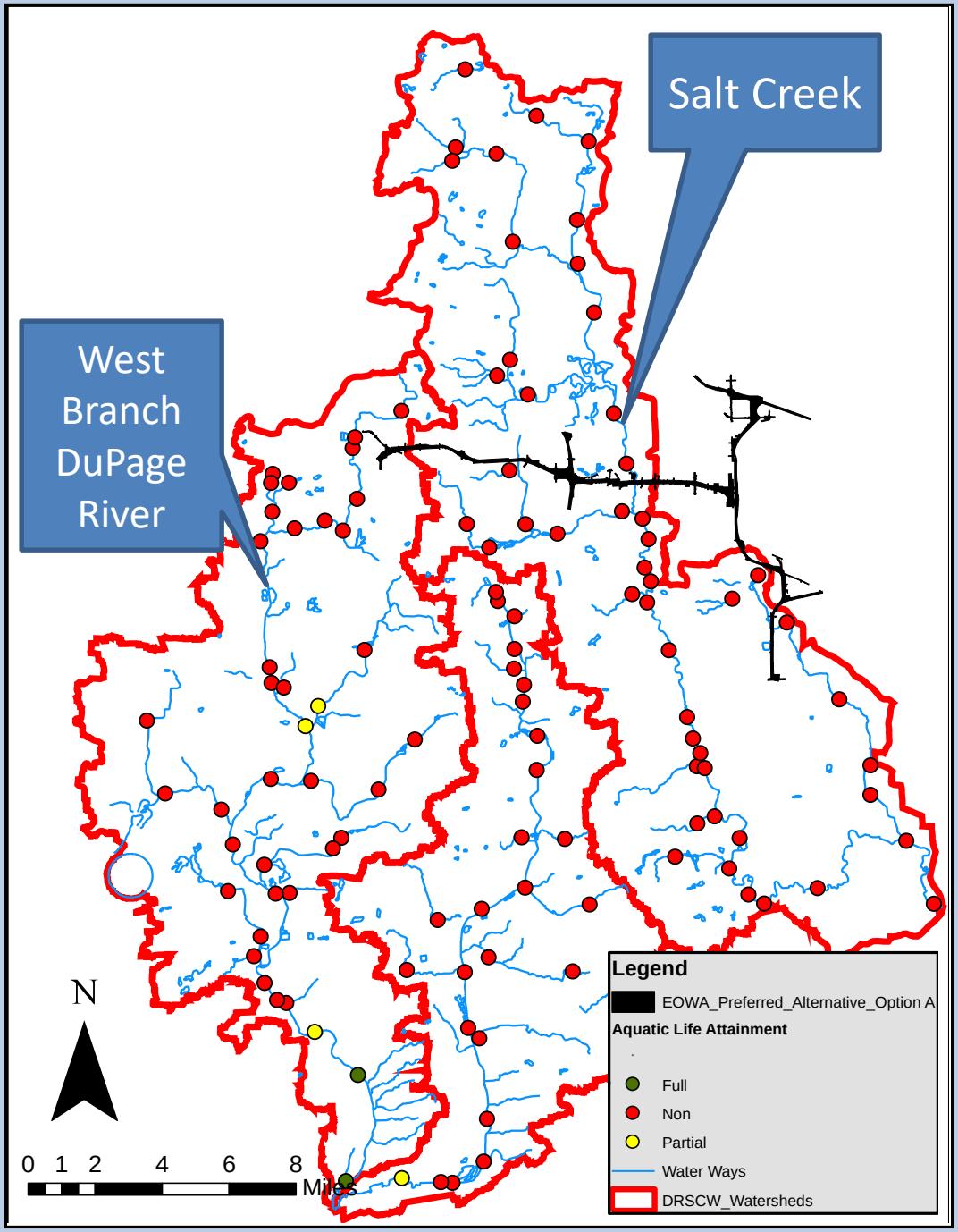

Summer Violations of WQ Standard 2006 -2014
456 mg/l Salt Creek, 2013 Rolling Readows
553 mg/l 2012 Bartlett
1,350 mg/l Spring Brook 2010 Roselle
920 mg/l 2012 Bartlett
920 mg/l 2012 Bartlett
716 mg/l 2011 Bloomingdale
662 mg/l 2009, 904 mg/l 2012 Springbrook Wheaton
590 mg/l 2007, 614 mg/l 2010 Oakrook Tributary, Oakbrook
Us
N
W
E
S

Elgin O'Hare Western Access Project Details

- 25 miles of Mainline Improvements
- 16 Service Interchanges
- 4 System Interchanges
- 16 miles of Arterial Improvements
- Provisions for Transit and Bicycle/ Pedestrian Facilities



EOWA & DRSCW Area Map



- Environmental Impact Assessment suggested water quality standards would not be violated post project

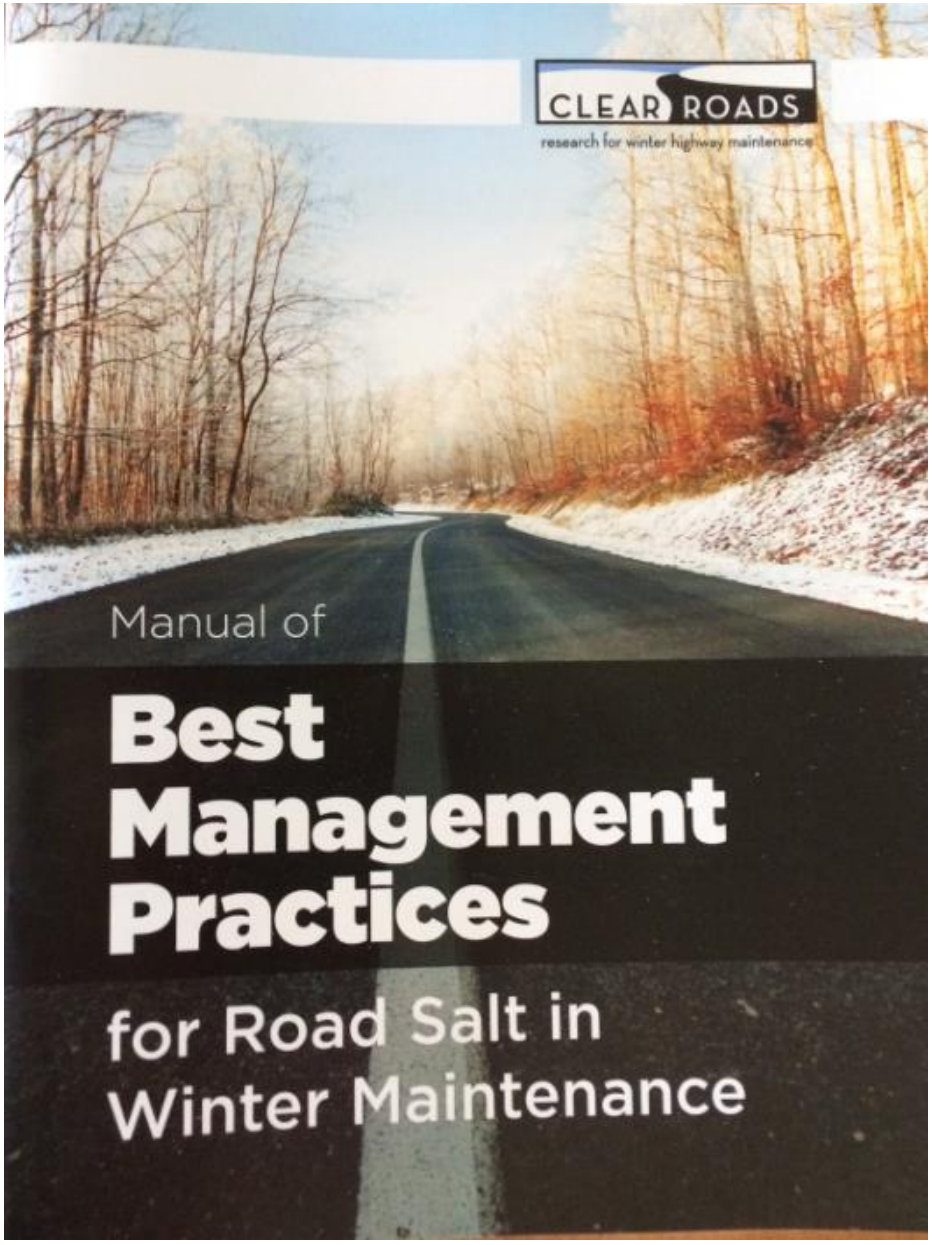
- Argued that aquatic life was already highly impaired meaning any additional impacts would be small

- DRSCW challenged modeling vigorously and the Illinois Tollway agreed with their critiques

Concept

Two steps to reach “no net increase”

- Tollway reviews current practices (estimated reduction of 20%)
- Remaining increase in loading offset by reductions made by communities neighboring EOWA (9 Tier 1 Communities)
  - Additionally partners agreed to offset at a minimum ratio of 1-1.25 so target 1,853 tons
  - Includes tracking practices, application rates and ambient water quality data


CLEAR ROADS
research for winter highway maintenance
Manual of
Best Management Practices
for Road Salt in Winter Maintenance


Safe and Sustainable Snowfighting
Snowfighter's Handbook

Questions?

Stephen McCracken

The Conservation Foundation, DRSCW

smccracken@theconservationfoundation.org

630-428-4500 X11